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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/036,479	01/07/2002	John Alec Sydney Smith	604-624	3561

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EXAMINER	
HOGAN, MARY C	
ART UNIT	**PAPER NUMBER**
2123	

DATE MAILED: 02/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/036,479	SMITH ET AL.	
	Examiner	Art Unit	
	Mary C Hogan	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 April 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/16/02*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This application has been examined.

2. **Claims 1-26** have been examined and rejected.

Information Disclosure Statement

3. The information disclosure statement filed 4/16/02 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered. References to Paulraj et al and Lin et al have not been included with the IDS.

4. It is noted that this application is a continuation of PCT/GB00/02582, and a search report on this application was completed 9/26/00. It is respectfully requested that the search report and the documents referenced on it be submitted to the Office for consideration.

Specification

5. The disclosure is objected to because of the following informalities. Appropriate correction is required.

6. The specification should contain headings outlining the various sections of the specification (see below). It is suggested that the following headings are added to the specification: Background of the Invention (page 1, below the title), Summary of the Invention (page 2, line 31), Brief Description of the Drawings (page 15, line 3), Detailed Description (page 15, line 20).

7. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

(a) TITLE OF THE INVENTION.

(b) CROSS-REFERENCE TO RELATED APPLICATIONS.

(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.

(d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)

(e) BACKGROUND OF THE INVENTION.

(1) Field of the Invention.

(2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.

(f) BRIEF SUMMARY OF THE INVENTION.

(g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).

(h) DETAILED DESCRIPTION OF THE INVENTION.

(i) CLAIM OR CLAIMS (commencing on a separate sheet).

(j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).

(k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

8. Page 6, line 31, the acronym "FID" should be defined.

9. Page 33, line 33 recites "Figure 10", however it is unclear as to whether it should point to Figure 11 instead of Figure 10.

Claim Objections

10. **Claims** are objected to because of the following informalities. Appropriate correction is required.

11. **Claims 14** and **25** recite "for the or each such pair". This section of the limitation appears to be incomplete.

Claim Interpretation

12. **Claims 14** and **25** recite "for the or each such pair". This section of the limitation appears to be incomplete. This claim was interpreted to read "for each such pair".

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15. **Claims 1-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Barrall et al (U.S. Patent Number 6,392,408), herein referred to as Barrall, and further in view of Schaewe et al (Schaewe et al, "Parallel Algorithms for Maximum A Posteriori Estimation of Spin Density and Spin-Spin Decay in Magnetic Resonance Imaging", IEEE Transactions on Medical Imaging, Vol. 14, No. 2, June 1995), herein referred to as **Schaewe**.

16. As to **Claims 1, 9, 12, 15, 19 and 23**, **Barrall** teaches: (producing means for) producing response signal (column 7, lines 3-6, lines 14-21, column 10, lines 45-51); (detecting means for) detecting a signal comprising a resonance response from the sample (column 10, lines 51-60); (comparing means for) comparing the signal to a predetermined model of a signal (response from a sample) due to a

phenomenon, thereby to determine whether the signal is due to that phenomenon (whether the sample is present) (column 14, lines 52-67); storage means for storing a predetermined model of a signal due to a phenomenon (column 15, lines 1-10).

17. As to **Claim 2, Barrall** teaches: wherein the predetermined model is a predetermined model of a response from a particular sample and the comparing step is to determine whether the model represents a response from the particular sample (column 9, lines 21-27, column 14, line 52-59, column 15, lines 1-4).

18. As to **Claim 3, Barrall** teaches: wherein the signal comprises a response from a sample and an undesired signal and the comparing step is to distinguish the response from the undesired signal (column 11, lines 17-43).

19. As to **Claims 6 and 17, Barrall** teaches: wherein the producing step and the comparing step are carried out with models having increasing numbers of components (column 11, lines 28-43).

20. As to **Claims 8, 18 and 20, Barrall** teaches: a method of testing a sample, further comprising applying excitation to the sample and detecting the response to yield the signal (column 10, lines 45-55).

21. As to **Claims 10 and 21, Barrall** teaches: a method according to claim 8 wherein the signal is compared to a predetermined model of an undesired signal, the method further comprising applying further excitation in dependence on the result of the comparison (Figures 8a-8c, column 15, lines 54-58).

22. As to **Claims 11 and 22, Barrall** teaches: wherein the excitation is arranged to excite quadrupole resonance (column 10, lines 45-51).

23. As to **Claims 13 and 24, Barrall** teaches: providing an alarm signal if the sample is determined to be present (column 15, line 64-column 16, line 8).

24. As to **Claims 14 and 25, Barrall** teaches: wherein the method is a method of nuclear quadrupole resonance testing a sample containing quadrupolar nuclei (column 10, lines 45-52), which sample may give rise to spurious signals which interfere with response signals from the quadrupolar nuclei (column 10, lines 51-60, column 11, line 67-column 12, line 9), the method further comprising: applying a pulse sequence to the sample to excite nuclear quadrupole resonance, the pulse sequence comprising at least one pair of pulses (column 10, lines 13-18, lines 45-51); detecting response signals (column 10, lines 51-60); and comparing, for the or each such pair, respective response signals following the two member pulses of the pair (column 11, lines 39-43, column 14, lines 52-57); the pulse sequence being such that respective spurious signals following the two member pulses can be at least partially cancelled by the comparison without corresponding true quadrupole resonance signals being completely cancelled (column 11, lines 28-39).

25. As to **Claim 16, Barrall** teaches: wherein the apparatus is adapted to produce models of the signal, and to compare the models to a predetermined model, until the model is determined to represent a signal due to the phenomenon or until a given number of repetitions have been completed (Figures 8a-8c, column 15, lines 54-58).

26. As to **Claim 26, Barrall** teaches: A computer readable medium having stored thereon a program for carrying out the method of claim 1 (column 10, lines 18-27, Figure 3, element 32, column 11, lines 10-16, column 14, lines 52-67).

27. As to Claims **1, 4, 5, 7, 9, 12, 15, 19 and 23, Barrall** further teaches using time domain techniques (column 14, lines 63-67, column 15, lines 39-49). Although **Barrall** teaches producing a response signal which includes the response and undesired signal, **Barrall** does not expressly teach producing a model of this response signal, wherein the model models the response and the undesired signal, comparing the model to a predetermined model of an undesired signal, comparing the model to a predetermined model of a response from a sample, wherein the producing step is carried out using a statistical time domain technique.

28. **Schaewe** teaches measuring and modeling methods used for magnetic resonance imaging including producing a model of this response signal using a statistical time domain techniques, wherein the model models the response and the undesired signal wherein the noise is modeled and suppressed for image quality (equations 1, 4-5, Section III A, Section III B, paragraph 2, page 309, column 2, paragraph 1, Section V, second paragraph).

29. Although **Schaewe** is directed to magnetic resonance imaging, both **Schaewe** and **Barrall** are directed spectroscopy methods and to the measurements of resonance responses including capturing these response signals containing FID and echo signals (**Schaewe**, Section II, first paragraph, last sentence). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the signal response as taught in **Barrall** to be model the signal response and undesired signal using statistical time domain techniques as taught in **Schaewe** since modeling the resonance response of a signal using statistical time domain techniques is known in the spectroscopy art as taught in **Schaewe**. Further, **Barrall** alludes to time domain techniques and using characteristics of a signal in memory for comparison to the measured resonance response signal that may be concluded to be a form of a model for the signal although not expressly stated. It would have been obvious to compare the model to a predetermined model for a signal and a model for an undesired signal since it would have been obvious to model the signal response and noise as taught by **Schaewe** as discussed previously, and since **Barrall**

already teaches comparing the response signal to the expected response signal for a particular sample after the noise component is filtered out.

Conclusion

30. The prior art made of record, see PTO 892, and not relied upon is considered pertinent to applicant's disclosure, careful consideration must be given prior to Applicant's response to this Office Action.

31. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary C Hogan whose telephone number is 571-272-3712. The examiner can normally be reached on 7:30AM-5PM Monday-Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Teska can be reached on 571-272-3716. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mary C Hogan
Examiner
Art Unit 2123